

30 YEARS OF ENVIRONMENTAL PROGRESS



**pollutants are being released from specific industrial facilities • Shoreham nuclear power plant on Long Island
million people participate in 20th anniversary of Earth Day • Clean Air Act amendments begin reduction of acid**

ECOSYSTEMS

“Sooner or later, wittingly or unwittingly, we must pay for every intrusion on the natural environment.”

— Barry Commoner

Cummings and West Beaches in Stamford, Connecticut were no place to be the last week of July 1987. Waves of dead bunker - a small herring - were washing up and the waters between the two beaches rippled with dead fish. “There was wall-to-wall dead fish,” said one resident, “You could walk across.”

Fish, like people, need to breathe. Our oxygen is in the air; theirs is dissolved in water. And by the 1980s, hypoxia - low levels of dissolved oxygen - had become a significant summertime problem throughout Western Long Island Sound. The bunker, chased into the shallow waters by hungry blues, asphyxiated. There was not enough dissolved oxygen in the harbor’s water to sustain them.

Long Island Sound’s water quality problems began with too much nitrogen. Nitrogen, a nutrient, is released during the breakdown of waste in sewage treatment plants. It’s also a component of fertilizer, and rain washes it from lawns, golf courses and crop land into the streams and rivers that feed the Sound.

The excess nitrogen provides a feast for the algae that grows in the

Sound’s waters during warm summer months. The algal life cycle is brief, and when the massive bloom dies, it sinks to the bottom and decays, consuming oxygen and causing hypoxia.

A survey of the Western Sound in the late 80’s found nitrogen levels to be even worse than suspected. EPA said, “Enough!” Nitrogen levels needed to be frozen immediately until agreement could be reached on cost-effective ways to reduce them. This triggered fears of a moratorium on growth - limits on hooking new homes to sewer systems. Hundreds of construction workers protested at EPA meetings.

The solution was a combination of controls on runoff and upgrades to sewage treatment plants to reduce nitrogen output. Protest turned to support as hardhats allied with environmentalists to lobby for construction funding. EPA reached agreement with Connecticut and New York on a plan that has already cut nitrogen discharges 25 percent.

Long Island Sound is one of six Region 2 estuaries targeted under EPA’s National Estuary Program. Estuaries are unique ecosystems where rivers meet the sea and



Photo Credit: L.I. Soundkeeper

1987: Dead fish blanket Stamford Harbor

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Long Island Sound Nitrogen Down 25% in 5 Years

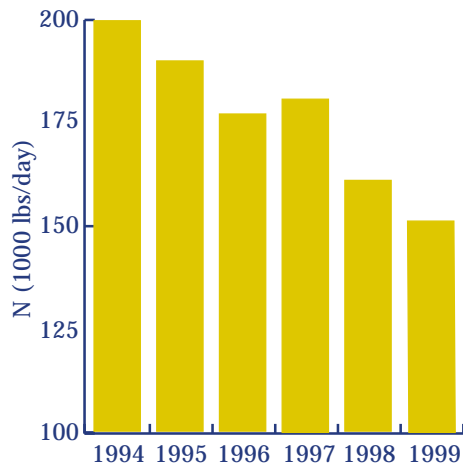


Chart Credit: C. Sebastian/EPA

freshwater mixes with salt. They are home to many species of fish, birds, and other wildlife and are critical for the survival of others that may breed or feed there. The Agency looks beyond water quality to address the entire estuary system - its chemical, physical and biological properties, as well as its economic, recreational and aesthetic values.

Tidal marshes and wetlands are an integral part of estuaries. They protect water quality by filtering sediment and pollution from upstream sources, while buffering the impacts of ocean storms. Freshwater wetlands are equally important, slowing the flow of water, filtering it and giving it a chance to recharge underground water supplies, as well as functioning as enormous sponges during times of flooding. And wetlands provide habitat for hundreds of

native and transient species; fully half of New York's 160 endangered or threatened species depend on wetlands for their survival.

Until recently, wetlands everywhere were seen as something to be ditched and drained for farming or filled in for development. When Giovanni da Verrazano explored America's eastern coast in 1524, some 220 million acres of wetlands existed in the lower 48 states. Since then, over half of these wetlands have been lost. Increasing flood and drought damage and declining bird populations are, in part, the result of the degradation and destruction of wetlands.

The federal wetlands policy is "no net loss." A permit to fill wetlands, issued by the Army Corps of Engineers under EPA guidelines, is given only after alternatives have been evaluated and then the loss must be offset by wetlands restoration. Restoring a

damaged wetland typically means restoring water flow to its natural state. Southbound commuters on the eastern spur of the New Jersey Turnpike have been able to watch the progress on one of the area's largest restoration projects. The Hackensack Meadows Development Commission is regrading 140 acres of marsh to increase tidal flow. The area, complete with nature trail, will be replanted to restore its natural variety of species.

Ecosystems, and the problems affecting them, transcend political, social and economic boundaries. Cooperative efforts to protect and improve the Great Lakes Basin ecosystem involve eight states, Canada and numerous Indian tribes. Successes to date include reducing algal growth in Lake Erie, controlling the sea lamprey, and reducing levels of toxics entering the system. By containing old landfills and other sources along the Niagara River, EPA



Wetlands filter water, control flooding and provide habitat for hundreds of species.



Restoring the flow of water brings new life to a damaged wetland.

has cut levels of 18 river contaminants - from PCBs to DDT - by better than 50 percent.

Air pollution, borne great distances on the wind, also has an ecological effect. Mountain ecology from the Great Smokeys in Tennessee to New York's Adirondacks and the White Mountains in New England is impacted by emissions from power plants in the Midwest. Forests and water bodies alike have been affected. Red spruce and other high-elevation trees have been killed by the millions. Honnedaga Lake, beneath Ice Cave Mountain in the western Adirondacks, is a strange black-blue color. The plankton and other microscopic life that give healthy lakes their aquamarine color are dead as is the lake's once abundant fish population. The lake is dead, its water turned to acid. In all, some 300 lakes and ponds in

the Adirondacks are now too acidic to support life.

Air pollution from the burning of fossil fuels - primarily coal - is the major cause of acid rain. The rain is created when emissions of sulfur dioxide (SO₂) and oxides of nitrogen (NO_x) react in the atmosphere with water, oxygen and oxidants to form mild solutions of sulfuric acid and nitric acid. Sunlight increases the rate of most of these reactions. The acids, which can travel hundreds of miles, ultimately fall to the earth as rain, snow or fog.

Electric utility plants account for about 70 percent of annual SO₂ emissions and 30 percent of NO_x emissions in the United States. EPA's acid rain program seeks to cut these emissions in half by 2010.

The Agency is taking a carrot and stick approach with the utilities. The carrot: to hold down costs, EPA adopted a landmark market approach to cut SO₂ emissions, establishing an acid rain trading program with the Chicago Board of Trade. If SO₂ emissions from one utility fall below permissible levels, it earns allowances that can be sold to another utility as a credit.

And the stick: EPA sued seven electric utility companies and the Tennessee Valley Authority in 1999, charging that they had made major modifications

to many of their plants without installing the equipment required to control smog, acid rain and soot. As a result, the plants for years had illegally released tens of millions of tons of sulfur dioxide, nitrogen oxides, and particulate matter into the air. EPA's action will force the facilities to install appropriate air pollution-control technology.

The program is working: acid rain emissions nationally are 20 percent below target. Equally encouraging is the low cost of getting there. When the acid rain goals were announced, utilities put the cost of achieving them at \$6 billion a year. A recent study estimates actual costs to be less than \$800 million a year. These figures are borne out by free market trading. While a one-ton SO₂ allowance was expected to sell for up to \$1,500, the most recent average price was \$117/ton.



Sulfur dioxide emitted in the Midwest falls as acid rain in the Northeast.